

## **CHAPTER 6**

### **RESTORATION PRIORITIES IN THE LOWER TENNESSEE RIVER WATERSHED**

- 6.1. Background**
- 6.2. Comments from Public Meetings**
  - 6.2.A. Year 1 Public Meeting**
  - 6.2.B. Year 3 Public Meeting**
  - 6.2.C. Year 5 Public Meeting**
- 6.3. Approaches Used**
  - 6.3.A. Point Sources**
  - 6.3.B. Nonpoint Sources**

#### **6.1. BACKGROUND.**

The Watershed Water Quality Management Plan serves as a comprehensive inventory of resources and stressors in the watershed, a recommendation for control measures, and a guide for planning activities in the next five-year watershed cycle and beyond. Water quality improvement will be a result of implementing both regulatory and nonregulatory programs.

In addition to the NPDES program, some state and federal regulations, such as the TMDL and ARAP programs, address point and nonpoint issues. Construction and MS4 storm water rules (implemented under the NPDES program) have transitioned from Phase 1 to Phase 2. More information on storm water rules may be found at: <http://www.state.tn.us/environment/wpc/stormh2o/MS4.htm>.

This Chapter addresses point and nonpoint source approaches to water quality problems in the Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed.

**6.2. COMMENTS FROM PUBLIC MEETINGS.** Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permittees, business people, farmers, and local river conservation interests. Locations for meetings were chosen after consulting with people who live and work in the watershed. Everyone with an interest in clean water is encouraged to be a part of the public meeting process. The times and locations of watershed meetings are posted at: <http://www.state.tn.us/environment/wpc/watershed/public.php>.

**6.2.A. Year 1 Public Meeting.** The first Lower Tennessee River Watershed public meeting was held September 22, 1998 at Sale Creek High School. The goals of the meeting were to: (1) present, and review the objectives of, the Watershed Approach, (2) introduce local, state, and federal agency and nongovernment organization partners, (3) review water quality monitoring strategies, and (4) solicit input from the public.

#### Major Concerns/Comments

- Well water quality and availability
- Water supply infrastructure planning
- Lake draw down effects on fish and other aquatic organisms
- Lack of a management plan for development
- Plans to place a landfill too close to the Tennessee River, Sale Creek and individual wellheads
- Citizens in this watershed have no power in comparison to Chattanooga. Ability to maintain quality of life and high water quality may be lost
- Pollution leading to health concerns and to impacts on fish and aquatic life

**6.2.B. Year 3 Public Meeting.** The second Lower Tennessee River Watershed public meeting was held March 27, 2001 at the Chattanooga TDEC Field Office.. The goals of the meeting were to: (1) provide an overview of the watershed approach, (2) review the monitoring strategy, (3) summarize the most recent water quality assessment, (4) discuss the TMDL schedule and citizens' role in commenting on draft TMDLs, and (5) discuss BMPs and other nonpoint source tools available through the Tennessee Department of Agriculture 319 Program and NRCS conservation assistance programs.

#### Major Concerns/Comments

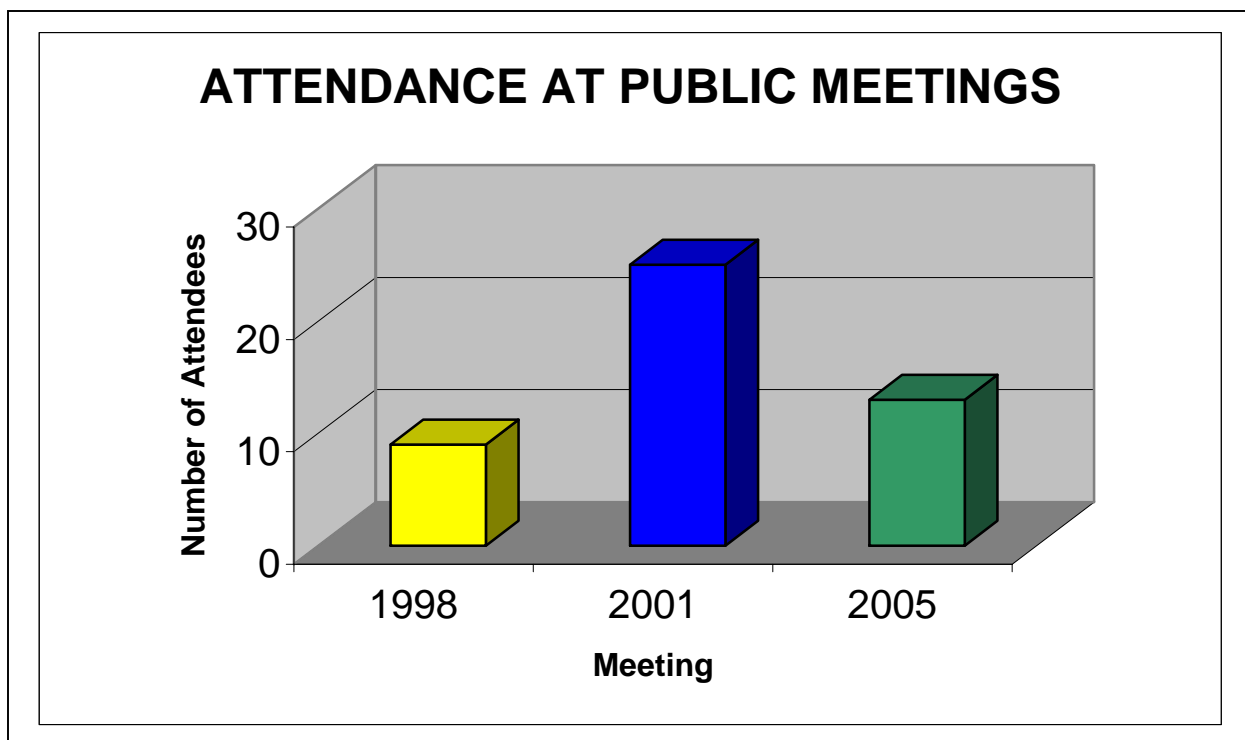
- Loss of riparian habitat and runoff from residential construction
- Loss of riparian zones from rip-rap
- Loss of land and soil associated with raising TVA lake levels
- Large hulled pleasure boats causing bank instability

- Industrial forestry sprawl leading to loss of soil and to nutrient and sediment problems in lakes
- More low flow streams than ever
- Lake stratification and partial eutrophication of lakes in summer
- Aquatic weeds, especially during drought conditions

**6.2.C. Year 5 Public Meeting.** The third scheduled Lower Tennessee River Watershed public meeting was held November 14, 2005 at the Rhea County Welcome Center in Dayton. The meeting featured six educational components:

- Overview of draft Watershed Water Quality Management Plan slide show
- Benthic macroinvertebrate samples and interpretation
- SmartBoard™ with interactive GIS maps
- “How We Monitor Streams” self-guided slide show
- “Why We Do Biological Sampling” self-guided slide show
- TVA display

In addition, citizens had the opportunity to make formal comments on the draft Watershed Water Quality Management Plan.



**Figure 6-1. Attendance at Public Meetings in the Lower Tennessee River Watershed.**  
Attendance numbers do not include TDEC personnel.



*Figure 6-2. The SmartBoard™ is an Effective Interactive Tool to Teach Citizens About the Power of GIS.*



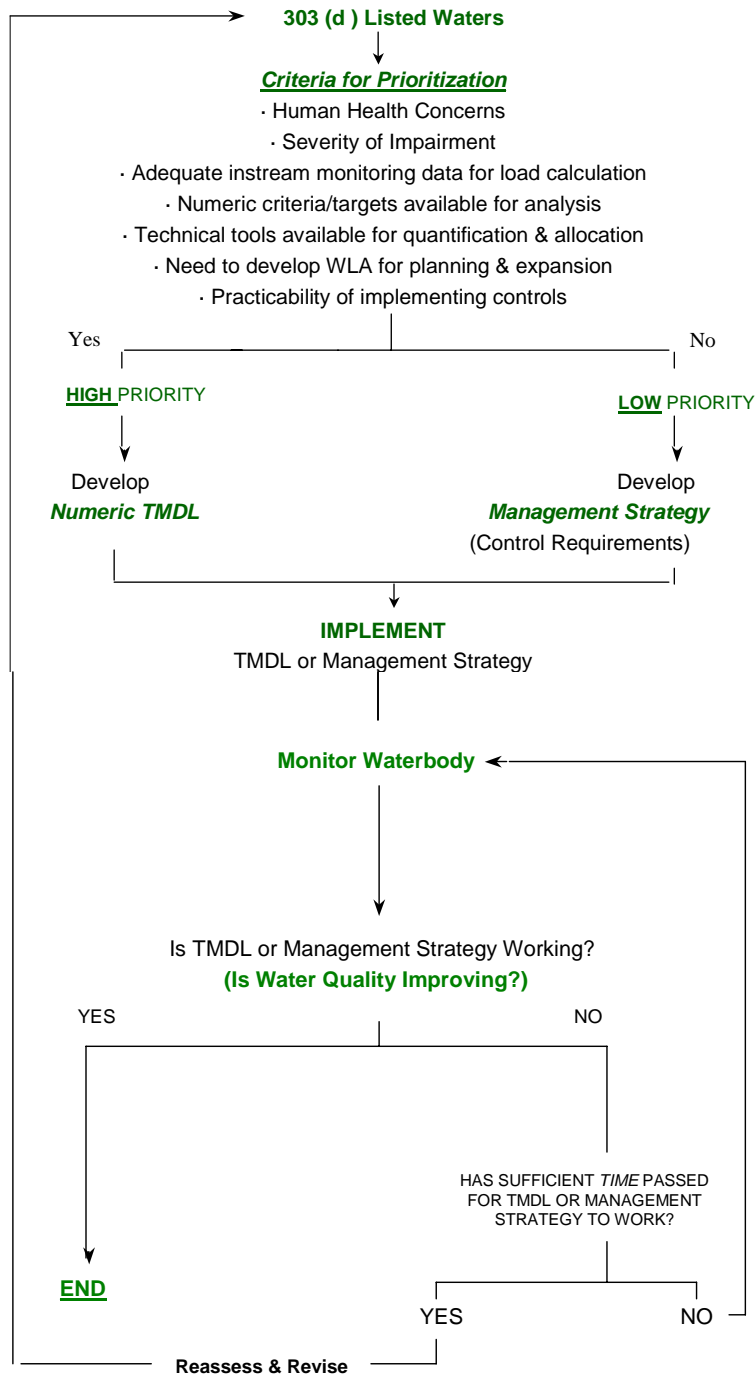
*Figure 6-3. Watershed Meetings are a Good Opportunity for TDEC Staff to meet with Local and County Planning Officials to Discuss Watershed Protection.*

### **6.3. APPROACHES USED.**

**6.3.A.** Point Sources. Point source contributions to stream impairment are primarily addressed by NPDES and ARAP permit requirements and compliance with the terms of the permits. Notices of NPDES and ARAP draft permits available for public comment can be viewed at <http://www.state.tn.us/environment/wpc/wpcppo/>. Discharge monitoring data submitted by NPDES-permitted facilities may be viewed at [http://www.epa.gov/enviro/html/pes/pes\\_query\\_java.html](http://www.epa.gov/enviro/html/pes/pes_query_java.html).

The purpose of the TMDL program is to identify remaining sources of pollution and allocate pollution control needs in places where water quality goals are still not being achieved. TMDL studies are tools that allow for a better understanding of load reductions necessary for impaired streams to return to compliance with water quality standards. More information about Tennessee's TMDL program may be found at: <http://www.state.tn.us/environment/wpc/tmdl/>.

TMDLs are prioritized for development based on many factors.



**Figure 6.4. Prioritization Scheme for TMDL Development.**

### **6.3.B. Nonpoint Sources**

Common nonpoint sources of pollution include urban runoff, riparian vegetation removal, and inappropriate land development, agricultural, and road construction practices. Since nonpoint pollution exists essentially everywhere rain falls, existing point source regulations can have only a limited effect. Other measures are, therefore, necessary.

There are several state and federal regulations that address some of the contaminants impacting waters in the Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed. Most of these are limited to only point sources: a pipe or ditch. Often, controls of point sources are not sufficient to protect waters, so other measures are necessary. Some measures include efforts by landowners and volunteer groups and the possible implementation of new regulations. Many agencies, such as the Tennessee Department of Agriculture (TDA) and the Natural Resources Conservation Service (NRCS), offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be sufficient for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education.

The following text describes types of impairments, possible causes, and suggested improvement measures. Restoration efforts should not be limited to only those streams and measures suggested below.

#### **6.3.B.i. Sedimentation.**

**6.3.B.i.a. From Construction Sites.** Construction activities have historically been considered “nonpoint sources.” In the late 1980’s, EPA designated them as being subject to NPDES regulation if more than 5 acres were being disturbed. In the spring of 2003, that threshold became 1 acre. The general permit issued for such construction sites establishes conditions for maintenance of the sites to minimize pollution from storm water runoff, including requirements for installation and inspection of erosion controls. Also, the general permit imposes more stringent inspection and self-monitoring requirements on sites in the watershed of streams that are affected by sedimentation.

Construction sites within a sediment-impaired watershed may also have higher priority for inspections by WPC personnel, and are likely to have enforcement actions for failure to control erosion.

The same requirements apply to sites that drain into high quality waters. Sewee Creek, Rock Creek, Hall Creek, Whites Creek, Laurel Creek, Little Laurel Creek, Piney River, Piney Creek, Soak Creek, Richland Creek, and Tignes Creek are examples of high quality streams in the Group 3 portion of the Lower Tennessee River Watershed.

**6.3.B.i.b.** From Channel and/or Bank Erosion. Many streams within the Lower Tennessee River Watershed exhibit streambank erosion. When stream channels are altered, or large tracts of land are cleared, storm water runoff, will cause banks to become unstable and highly erodable. Heavy livestock traffic can also severely disturb banks. Additionally, streams that flow off the Cumberland Plateau may exhibit braiding and widening of the streambed and highly erodable banks that may be especially severe during rain events. Destabilized banks contribute to sediment load and to the loss of beneficial riparian vegetation to the stream. This is especially problematic in certain areas of the Lower Tennessee River Watershed where the very sandy plateau soils and shallow rooted trees are especially vulnerable. Streambank destabilization in this area may be hastened by rock harvesting operations on the escarpment and by inappropriate agricultural practices.

In response to citizen and local government concerns related to streambank stability in both Hamilton and Rhea Counties, the Commissioner of TDEC encouraged the formation of the Hamilton-Rhea Stream Task Force. The task force is comprised of federal agencies (USGS, NRCS, FEMA, USACOE, and TVA), state agencies (TDEC-WPC and TDOT), local agencies (Hamilton County, Rhea County, Town of Graysville, and Town of Soddy-Daisy), and citizens living in the watershed. The goals of the task force are to seek sound solutions to immediate problems and to develop a long-term strategy for resolving the threat to life and property caused by the aggressively eroding streambanks. The task force identified locations on each of the streams where problems are occurring. These include Falling Water Creek, North Chickamauga Creek, Big Soddy Creek, Possum Creek, Rock Creek, Roaring Creek, and Richland Creek. Each location identified was then prioritized according to severity of threat. Potential mitigation options were determined and evaluated. Funding availability was analyzed, and a grant was obtained to address the situations classified as the highest priorities (more imminent threats).

#### *Voluntary activities*

- Re-establish bank vegetation.
- Establish off-channel watering areas for livestock by moving watering troughs and feeders back from stream banks (examples: Piney River, Little Piney Creek, Richland Creek, Little Richland Creek, White Creek, Lewis Creek, Long Savannah Creek, Sale Creek, Rogers Branch, and Grasshopper Creek).
- Limit cattle access to streams and bank vegetation through the use of cross fencing and heavy-use area protection (examples: Piney River, Little Piney Creek, Richland Creek, Little Richland Creek, White Creek, Lewis Creek, Long Savannah Creek, Sale Creek, Rogers Branch, and Grasshopper Creek).
- Educate potential and existing homeowners to the drawbacks of living in an area susceptible to damage from flooding and erosion.

#### *Additional strategies*

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective management practices.
- Better community planning for the impacts of development on small streams, especially development in growing areas (examples: Roaring Creek, Rock Creek, Possum Creek, Piney River, Richland Creek, Soddy Creek, and Sale Creek).

- Limit livestock access to streams and bank vegetation (examples: Piney River, Little Piney Creek, Richland Creek, Little Richland Creek, White Creek, Lewis Creek, Long Savannah Creek, Sale Creek, Sewee Creek, Little Sewee Creek, and Grasshopper Creek).
- Require post-construction run-off rates to be no greater than pre-construction rates in order to avoid in-channel erosion (examples: Richland Creek, Soddy Creek, and Roaring Creek).
- Implement additional restrictions on logging in streamside management zones (examples: Sewee Creek, Piney River, and Rock Creek).
- Limit clearing of stream and ditch banks (examples: Roaring Creek, Rock Creek, Possum Creek, and Sale Creek). *Note: Permits may be required for any work along streams.*
- Limit road and utilities crossings of streams (examples: Sewee Creek, Rock Creek, Hall Creek, Whites Creek, Laurel Creek, Little Laurel Creek, Piney River, Piney Creek, Soak Creek, Richland Creek, Laurel Creek, and Tigues Creek).
- Restrict the use of off-highway vehicles on stream banks and in stream channels (examples: Sewee Creek, Rock Creek, Hall Creek, Whites Creek, Laurel Creek, Little Laurel Creek, Piney River, Piney Creek, Soak Creek, Richland Creek, Laurel Creek, and Tigues Creek).

**6.3.B.i.c.** From Agriculture and Silviculture. The Water Quality Control Act exempts normal agricultural and silvicultural practices that do not result in a point source discharge. Nevertheless, efforts are being made to address impacts due to these exempted practices.

The Master Logger Program has been in place for several years to train loggers how to install Best Management Practices that lessen the impact of logging activities on streams. Recently, laws and regulations were enacted which established that these BMPs must be used or the Commissioners of the Departments of Environment and Conservation and of Agriculture would be permitted to stop the logging operation that, upon failing to install these BMPs, was causing impacts to streams.

Since the Dust Bowl era, the agriculture community has strived to protect the soil from wind and soil erosion. Agencies such as the Natural resources Conservation Service (NRCS), the University of Tennessee Agricultural Extension Service, and the Tennessee Department of Agriculture have worked to identify better ways of farming, to educate the farmers, and to install the methods that address the sources of some of the impacts due to agriculture. Cost sharing is available for many of these measures. Lewis Branch, Rogers Branch, Wolftever Creek, Long Savannah Creek, Sale Creek, and Grasshopper Creek have already had, or are currently installing, several BMPs that address the sediment pollution in this watershed.

Many sediment problems traceable to agricultural practices also involve riparian loss due to close row cropping or pasture clearing for grazing. Agriculturally impacted streams which could benefit from the establishment of riparian buffer zones include Lewis Branch, Bivins Branch, and Little Sewee Creek.

### **6.3.B.ii. Pathogen Contamination.**

Possible sources of pathogens are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter from pets, livestock and wildlife washed into streams and storm drains. Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. The Division of Ground Water Protection within the Chattanooga Field Office and delegated county health departments regulate septic tanks and field lines. In addition to discharges to surface waters, businesses may employ either subsurface or surface disposal of wastewater. The Division of Water Pollution Control regulates surface water disposal.

Streams in the Group 3 portion of the Tennessee portion of the Lower Tennessee River Watershed known to have excessive pathogen contamination include Lewis Creek, Bivins Branch, and Little Sewee Creek. The bacterial contamination is from inappropriate agricultural practices.

Other measures that may be necessary to control pathogens are:

#### *Voluntary activities*

- Off-channel watering of livestock (examples: Piney River, Little Piney Creek, Richland Creek, Little Richland Creek, White Creek, Lewis Creek, Long Savannah Creek, Sale Creek, Rogers Branch, and Grasshopper Creek).
- Limit livestock access to streams (examples: Piney River, Little Piney Creek, Richland Creek, Little Richland Creek, White Creek, Lewis Creek, Long Savannah Creek, Sale Creek, Rogers Branch, and Grasshopper Creek).
- Improve and educate on the proper management of animal waste from feeding operations (examples: Bivins Branch and Lewis Creek).

#### *Enforcement strategies*

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Determine timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identify Concentrated Animal Feeding Operations not currently permitted.

#### *Additional strategies*

- Develop intensive planning in areas where sewer is not available and treatment by subsurface disposal is not an option due to poor soils, floodplains, or high water tables.
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes (examples: Spring City, Dayton, and Decatur).

### **6.3.B.iii. Excessive Nutrients and/or Dissolved Oxygen Depletion.**

These two impacts are usually listed together because high nutrients often contribute to low dissolved oxygen within a stream. Since nutrients often have the same source as pathogens, the measures previously listed can also address many of these problems. Elevated nutrient loadings are also often associated with urban runoff from impervious surfaces, from fertilized lawns and croplands, and faulty sewage disposal processes. Nutrients are often transported with sediment, so many of the measures designed to reduce sediment runoff will also aid in preventing organic enrichment of streams and lakes.

Other sources of nutrients can be addressed by:

#### *Voluntary activities*

- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones. Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures. Examples of streams that could benefit are Little Richland Creek, Lewis Creek, Wolftever Creek, and Bivins Branch.
- Use grassed drainage ways that can remove fertilizer before it enters streams.
- Use native plants for landscaping since they don't require as much fertilizer and water.

Physical changes to streams can prevent them from providing enough oxygen to biodegrade the materials that are naturally present. A few additional actions can address this problem:

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. As a general rule, all stream channels suffer from some canopy removal. An intact riparian zone also acts as a buffer to filter out nutrient loads before they enter the water.
- Discourage impoundments. Ponds and lakes do not aerate water. *Note: Permits may be required for any work on a stream, including impoundments.*

#### *Regulatory strategies.*

- Strengthen enforcement of regulations governing on-site wastewater treatment.
- Impose more stringent permit limits for nutrients discharged from sewage treatment plants (including Tennessee River downstream of Dayton STP outfall and Spring City STP in Piney River embayment).
- Timely and appropriate enforcement for noncomplying sewage treatment plants, large and small, and their collection system.
- Identify Concentrated Animal Feeding Operations not currently permitted.

#### **6.3.B.iv. Toxins and Other Materials.**

Although some toxic substances are discharged directly into waters of the state from a point source, much of these materials are washed in during rainfalls from an upland location, or via improper waste disposal that contaminates groundwater. In the Lower Tennessee River Watershed, a number of streams are damaged by storm water runoff from industrial facilities or urban areas. More stringent inspection and regulation of permitted industrial facilities, and local stormwater quality initiatives and regulations, could help reduce the amount of contaminated runoff reaching state waters. Examples of streams and waterbodies that could benefit from these measures include the many small, urbanized tributaries feeding Chickamauga Lake Reservoir.

Many materials enter our streams due to apathy, or lack of civility or knowledge by the public. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all blatant examples of pollution in streams.

Some of these problems can be addressed by:

##### *Voluntary activities*

- Provide public education.
- Paint warnings on storm drains that connect to a stream. (This would benefit Richland Creek, Little Richland Creek, Sale Creek, Soddy Creek, Little Soddy Creek, Hickman Branch, and Wolftever Creek).
- Sponsor community clean-up days (This would benefit Little Richland Creek, Little Soddy Creek, Poe Branch, Wolftever Creek, and Chickamauga Lake).
- Landscape public areas.
- Encourage public surveillance of their streams and reporting of dumping activities to their local authorities.

##### *Enforcement Strategies*

- Prohibit illicit discharges to storm drains.
- Strengthen litter law enforcement at the local level.

#### **6.3.B.v. Habitat Alteration.**

The alteration of the habitat within a stream can have severe consequences. Whether it is the removal of the vegetation providing a root system network for holding soil particles together, the release of sediment, which increases the bed load and covers benthic life and fish eggs, the removal of gravel bars, “cleaning out” creeks with heavy equipment, or the impounding of the water in ponds and lakes, many alterations impair the use of the stream for designated uses. Habitat alteration also includes the draining or filling of wetlands.

Individual landowners and developers are responsible for the vast majority of stream alterations. Some measures that can help address these problems are:

#### *Voluntary activities*

- Sponsor litter pickup days to remove litter that might enter streams
- Organize stream cleanups removing trash, limbs and debris before they cause blockage.
- Avoid use of heavy equipment to “clean out” streams (Possum Creek, Roaring Creek, and Rock Creek exhibit the effects from such activities).
- Plant native vegetation along streams to stabilize banks and provide habitat (especially in the downstream portions of Rock Creek, Possum Creek, and Roaring Creek).
- Encourage developers to avoid extensive use of culverts in streams (Little Richland Creek and Broyles Branch are examples of streams with large amounts of culverting).

#### *Current regulations*

- Restrict modification of streams by such means as culverting, lining, or impounding.
- Require mitigation for impacts to streams and wetlands when modifications are allowed.

#### *Additional Enforcement*

- Increased enforcement may be needed when violations of current regulations occur.

#### **6.3.B.v. Acid Mine Runoff.**

The Cumberland Plateau has had a long history of coal mining, much of which was done prior to any type of environmental regulation. Unfortunately, the legacy of many of these old mining sites is severe impacts to the streams that drain them in the form of pollution from metals and low pH from sulfuric acid.